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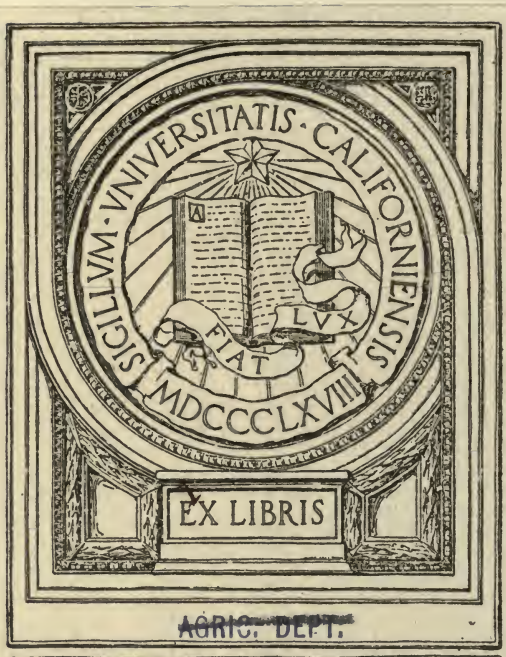

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DEPARTMENT OF AGRICULTURE,
NEW SOUTH WALES.

SCIENCE BULLETIN, No. 3.

September, 1911.

March Flies.

By

WALTER W. FROGGATT, F.L.S.,

Government Entomologist.

Workers in the respective branches of Economic Science covered by this series of Science Bulletins will receive such of them as may be of use in their special branches of study upon application to the Under Secretary, Department of Agriculture, Sydney.

† 1586 SYDNEY: WILLIAM APPLEGATE GULLICK, GOVERNMENT PRINTER.—1911.

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THE family *Tabanidæ* is one of the most important groups of the flies from an economic point of view, in habits, range, and numbers. In the latest list of Diptera, about 1,800 species have been described, of which the typical genus *Tabanus* contains half, or 900 species, from all parts of the world, and in this number are included forty-eight species found in Australia.

These biting flies are commonly known in the Australian bush as "March Flies," under the impression that they appear in March; but though usually most abundant towards the end of summer, they can be found in suitable localities all through the warmer months of the year. In England their popular name is "Breeze Flies," on account of their loud hum when flying; or "Gad Flies," on account of their blood-sucking propensities, and the way they annoy horses and cattle in their resting-places. In America they are known as "Green Heads," from the usual deep green tint of their very large eyes; and in some districts simply as "Horse Flies."

These flies are well known in the bush, not only from the savage way in which they fasten on one's horse to suck up blood, but also from the persistent manner in which they settle upon the hands and neck of the traveller, and allow themselves to be killed in their eagerness to draw blood.

The typical March Fly is of a uniform greyish brown, or dull-yellow tint, marked with brown; the abdominal segments barred or blotched with darker tints. The head is large, the greater portion taken up with the large eyes, which in the males almost meet at the front of the head. The thorax is well defined, as broad as the body, and fitting close against the head along the front margin. The wings are large, strongly veined, and adapted for sustained flight; the legs stout; and the abdomen of a uniform width from the hind margin of the thorax to the rounded tip of the abdomen, and somewhat flattened on the dorsal surface.

The male March Flies live upon the sap of plants, the honey-dew exuded by homopterous insects, aphids, &c.; and they sometimes attack aphids and other soft-bodied insects and suck up their blood; but it is only the female flies that have the true blood-sucking instinct. Like mosquitoes and other blood-sucking flies, it is probable that the females, in default of blood, adopt the habits of the males, and live upon vegetable sap.

The females deposit their spindle-shaped brown or black eggs in masses upon the foliage of plants growing on flat, swampy land, or round the edges of lagoons and water-holes. According to Professor J. S. Hine, several species in the United States hatch out in nine days. The larvæ live in wet soil, under rotten logs, or stones, and sometimes even in the water, where they feed upon all kinds of small creatures. Professor Hine reared them very easily in jars of moist earth, supplied with chopped-up worms. After pupating, they remained in the dormant state till the following spring, so that their life history occupied about eleven months.

The larvæ are elongate, eleven-jointed maggots, each segment encircled with a row of fleshy tubercles, very well defined on the ventral surface.

Nothing is known regarding the life-history of any of our Australian species, and there is a wide field for investigation in studying the earlier stages of our biting flies.

In other parts of the world a great deal of attention has been given to the range and life-histories of Tabanid flies, since it has been proved that several species transmit, when biting, the blood parasites of man and domesticated animals, causing some of the most deadly tropical diseases. In most of the tropical agricultural experiment stations the entomologists are devoting much of their time to the study of these flies. At the Agricultural Research Laboratories at Pusa, India, Mr. Howlett was specially engaged to work on these flies; and at Cairo, the Soudan, and other stations in tropical Africa, work is being carried out to find the distribution of these insects. In the laboratories of the Tropical School of Medicine at Liverpool, Mr. Newstead is tabulating the collections received from all parts of the world.

Mr. Austen, of the British Museum, has issued two works, one dealing with the "Tse-tse Flies of Africa," and the second with the biting flies of Great Britain. Miss Ormerod had previously, in her "Annual Reports on Injurious Insects," devoted many pages to them. All over the world collectors are on the lookout for flies belonging to this family, on account of the important *rôle* they play in economic entomology.

Through the publication of Part III of Dr. Kertesz's "Catalogus Dipterorum," 1908, we are now enabled to obtain some idea of the number of species that have been described, and the countries in which they are found. It is very unfortunate that so many of the Australian species have been described with no other locality attached except "New Holland" or "Australia." It is therefore only by collecting specimens, with authentic locality labels attached, and by sending duplicates to specialists where the original type specimens are kept and having them determined, that we can obtain any idea of the range of our indigenous species of biting flies.

The writer proposes to give some notes on the species known to him, some of which are figured in the accompanying plate, and a list of species described from Australia.

The genus *Pangonia* contains a number of large, handsome flies, found in open forest country, often resting upon the trunks of trees. The members of this genus have a world-wide range, and about twenty species have

been described from Australia. A species has been recorded from New Caledonia as being the cause of an outbreak of malignant pustules on cattle. They differ from the typical *Tabanus* in having ocelli, and the third joint of the antennæ elongate, instead of being compressed.

Pangonia guttata, Donov.

(Figs. 8 and 7.)

This large and handsome species was originally described and figured by Donovan in his now rare and costly work, "Insects of New Holland, 1805." It has been described and noticed a good many times since; by Guérin in the "Zoologie du Voyage de la Coquille," published in 1830; it was again figured by Macquart seven years later; and it is the insect shown as No. 2 on Plate XXVIII in "Australian Insects, 1907." It has a wide range along the eastern coast of Australia, but I have seen no specimens from the western coast. Kertesz also records it from Asia.

It is a large fly, measuring 1¼ inches from the tip of the wings to the front of the head, and is broad in proportion. The general colour is black to dark-chocolate brown on the upper surface of the thorax; the wings clouded with black at the base, running out into light brown towards the tips. The hind margin of the head is silvery white; the centre of the thorax marked with two parallel white stripes; a tuft of black hairs on either side, the sides of the thorax further ornamented with fine silky-white hairs that form an irregular band, with two tufts on the hind margin. Both the upper and under surfaces of the abdomen are marked with tufts of white hairs, the outer margins fringed with tufts of white and black hairs, the latter also fringing the hind margin of the apical segments of the abdomen.

Pangonia auriflua, Donov.

(Fig. 4.)

This handsome fly also has a wide range along the eastern coast, and was among the insects figured by Donovan. Kertesz has placed it in Rondano's genus *Diatomineura*.

It measures under three-quarters of an inch from the front of the head to the tip of wings, and is of the usual stout form, with rather short, rounded abdomen. The general colour of the eyes, upper surface of the thorax, and abdomen is black; the face, hind margin of head, and under surface of thorax and abdomen clothed with silvery white hairs. The centre of the dorsal surface of the thorax is marked with pale, whitish parallel bars, with a broad band of golden yellow hairs right round the sides and hind margin; a parallel row of three tufts down the centre of the abdomen, with the apical segments densely clothed with bright golden hairs. The wings are semi-transparent, with black nervures.

The genus *Tabanus* contains our common and most typical March Flies. It embraces an immense number of species, distinguished from the other genera of the family in having the eyes bare (not pubescent), and having no raised tubercle for the ocelli.

Tabanus abstersus, Walk.

This is one of the commonest and most widely distributed species in Australia, specimens have been received from Cardwell, North Queensland; Clarence River and Bega, New South Wales.

It measures slightly over half an inch in length from the front of the head to the tips of the wings. It is of the usual stout form, with the abdomen somewhat flattened. The general colour is dark-brown, shading into grey tints; the wings semi-opaque, with the nervures, base, and centre of the wings clouded with brown. The under surface of the head and thorax is clothed with fine, grey, downy hairs. The abdominal segments are edged along the hind margin with a fine white band, well-defined on the first four segments, and forming an angular blotch in the centre, sometimes, though not so distinctly, expanded on the sides.

Tabanus brevidentatus, Macq.

(Fig. 1.)

This is the common, small, greyish-brown March Fly, found in the scrub or bush around Sydney, which comes round trying to settle upon one's face or hands, to bite if undisturbed. They are most plentiful about shaded watercourses and valleys in the Hawkesbury country, and have a wide range along the coast.

It measures under three-quarters of an inch in length from the front of the head to the tips of the wings. The general colour is greyish-brown; face and under surface of the head and thorax clothed with silvery-white hairs. The centre of the upper surface of the thorax is marbled with darker brown; and the central portions of the abdominal segments lighter than the outer edges, with a delicate white line along the extreme hind margin of each segment. The wings are semi-transparent, with brown nervures.

Tabanus sanguinarius, Bigot.

(Fig. 2.)

This is one of our largest species, measuring up to an inch in length from the front of the head to the tips of the wings. The eyes are dark brown, with rich, silvery tints; the face dull white. General colour, yellowish brown; semi-opaque wings, slightly clouded with dull yellow along the front margins. The abdomen is somewhat flattened and rounded at the tip. This March Fly is common in the scrubs of the Tweed River and the northern parts of New South Wales, and ranges into Southern Queensland.

Tabanus ardens, Wiedm.

(Fig. 3.)

This fly was originally described from Java, but probably has a wide range over the Malay Archipelago, as it is very common in the open forest country of the Solomon Islands.

It measures slightly over half an inch in length from the front of the head to the tips of the wings. The eyes are dark and shining; face dull yellow; general colour brownish yellow, with the upper surface of the last two segments clouded in the centre with brown. The sides and under surface of thorax and abdomen are clothed with yellow hairs, which also form a fringe along the outer edge of the abdominal segments. Wings semi-opaque, clouded with brown; nervures brown.

Tabanus edentulus, Macq.

(Fig. 5.)

In size and general colouration this species might be easily taken for *Tabanus brevidentatus;* but it can be easily distinguished by the more irregular or lobed form of the thorax, which is of a uniform greyish-brown tint, not showing any darker black or brownish markings on the dorsal surface, while the apical bands on the hind margins of the abdominal segments are more defined and lighter coloured.

This species is common on the highlands of the southern parts of New South Wales, and probably ranges into eastern Victoria. Specimens in our collections were obtained at Binda, near Bega, and others from the slopes of Mount Kosciusko.

Tabanus gregarius, Erich.

(Fig. 9.)

This distinctive species is just under three-quarters of an inch in length from the front of the head to the tips of the wings. The head and thorax are lead-coloured; antennæ yellow at base, black at the tips; legs brownish on thighs, with tibiæ and tarsi yellow; wings hyaline, with the front margin very lightly clouded with yellow. The under surface of the head and thorax is clothed with long silvery hairs; the abdomen with fine golden hairs on upper and under surface. The abdomen is dull yellow, with a broad stripe of blackish brown down the centre of the back, spreading out towards the apex.

This species was originally described by Erichson, from Tasmania, but ranges along the eastern coast of Australia well into Queensland.

Tabanus jacksonii, Macq.

(Fig. 6.)

This large species is common on the slopes of Mount Kosciusko, and differs from all the other greyish-brown species in its larger size, uniform lead-coloured thorax, and the abdominal segments being mottled with yellow and brown down the centre, forming fine transverse bands fringed with golden hairs along the apical segments.

The face is grey, the antennæ and legs yellow. The under surface of the head and thorax is densely clothed with long, white, downy hairs; the under surface of the abdomen with more scattered hairs. Wings semi-opaque, slightly clouded, and blotched in the centre.

Tabanus Regis-Georgii, Macq.

This is one of the common species, found from the Tweed River, New South Wales, to Cardwell, North Queensland.

It measures slightly over half an inch in length from the front of the head to the tips of the wings. It is of a uniform light-brown tint, marbled with grey on the thorax, with the hind margins of the abdominal segments edged with greyish white; the wings transparent, with the front (subcostal) area shaded with brown.

Tabanus nigro-pictus, Macq.

This is a species found about the Richmond River, New South Wales. It is a large fly, measuring nearly an inch in length; of a uniform reddish-brown tint; the upper surface clothed with fine golden hairs, the under surface with grey hairs. The eyes are lead colour; and the dorsal surface of the thorax is mottled with black showing through the golden pubescence. It resembles *Tabanus sanguinarius* in size and general colouration, but differs in having darker markings upon the thorax.

Tabanus concolor, Walker.

This species has a wide range from Eastern Victoria to the Tweed River, New South Wales, and probably Southern Queensland. We have specimens from Mount Kosciusko.

It measures just under an inch in length from the front of the head to the tips of the wings, and is of a uniform dark-lead colour. There are a few scattered, short, white hairs on the sides of the thorax and along the apical edge of the abdominal segments. The under surface of the head and thorax is clothed with silvery long hairs, thickest below the mouth parts. The wings have brown nervures, and are slightly clouded, darkest towards the shoulders.

List of the Australian Species of the Biting Flies of the Family *Tabanidæ*, Described in Dr. C. Kertesz's Catalogue of the Diptera of the World, Vol. III., Budapest, 1908.

Family :—Tabanidæ.

Sub-family :—Pangoniinæ.

Genus :—APOCAMPTA (Schiner, 1867).

1. *Apocampta subcana*, Walker, List Dip. Brit. Museum, 1848 ; Ricardo, Annal. Mag. Nat. Hist. ser. 7, viii, 287, 1901 ; and ser. 7, xiv, 357, 1904.

Walker described it under the Genus *Chrysops*.

Diachlorus melas, Bigot, 1892, and *Apocampta nigra*, Schiner, 1868, are the same insect.

Australia.

Genus:—PELECORRHYNCHUS (Macquart, 1850).

2. *Pelecorrhynchus eristaloides*, Walker, *l.c.*, p. 193, 1848.
   Walker described this species in the Genus *Silvius*, 1848, and later, in the Supplementary Catalogue, 1854, in the Genus *Dasybasis*.
   AUSTRALIA AND TASMANIA.

3. *P. fusconiger*, Walker, *l.c.*, p. 192, 1848.
   He dealt with this species as with the previous one, placing it in the Genus *Silvius*.
   PORT STEPHENS, N.S.W., AUSTRALIA.

4. *P. maculipennis*, Macq., Exotic Diptera, 1850. Suppl. 4, 28, Tab. ii; Fig. 6.
   Macquart figured this fly, and it is again figured in the *Eugenies Resa*, 1868, by Thomas, who placed it in the Genus *Cœnopnyga*.
   AUSTRALIA AND TASMANIA

5. *P. personatus*, Walker, *l.c.*, p. 192, and Suppl. 1, 267, 1848.
   Walker dealt with this species as with Nos. 2 and 3.
   Schiner renamed it *P. ornatus* from New Zealand, 1868.
   AUSTRALIA AND NEW ZEALAND.

Genus:—SCIONE (Walker, 1850).

6. *Scione singularis*, Macq., *l.c.*, p. 192, Supp. 1, 27, Tab. iii, Fig. 2, 1845.
   Macquart figured this species under the Genus *Pangonia*.
   AUSTRALIA.

Genus:—PANGONIA (Latreille, 1802).

7. *Pangonia binotata*, Latr., Encyclop. Method. viii, 703, 1811.
   AUSTRALIA.

8. *P. conjungens*, Walk., List Dipt. B. Mus. 140, 1848. Ricardo Annal. and Mag. N. Hist. v, 114, 1900.
   WESTERN AUSTRALIA.

9. *P. dorsalis*, Macq. Dipt. Exot. 100, 1838. Walker, List Dip. B. Mus., Supp. 1, 144, 1854. Ricardo, *l.c*, p. 114, 1900.
   AUSTRALIA.

10. *P. fulviventris*, Macq., *l.c.*, 1838. Walk., *l.c.*, 1854. Ricardo, *l.c.*, p. 112, 1900. AUSTRALIA.

11. *P. maculiventris*, Westw. London and Edinburgh, Philos. Magaz., &c., vi, 449, 1835. Isis, ii, 87, 1838. Ricardo, *l.c.*, p. 114, 1900.
    AUSTRALIA.

12. *P. roei*, King's Narrative, Survey Coasts of Australia, ii, 467, 185, 1827. Wied, Aussereurop. Zweifl., Ins. 11, 647, 72, 1830. Walk., *l.c*, p. 145, 1848, and Supp. 1, 145, 136, 1854. Ricardo, *l.c.*, p. 114, 1900.
    AUSTRALIA.

13. *P. Walkeri*, Newm., Trans. Ent. Soc., London, n. ser. iv, 56, 1, 1857.
    AUSTRALIA.

Genus:—EREPHOPSIS (Ricardo, 1900).

14. *Erephopsis albinota*, Macq., *l.c.*, Supp., 5, 20, 61, 1855 (*Pangonia*). Ricardo, *l.c.*, p. 112, 1900. AUSTRALIA.

15. *E. aureohirta*, Ricardo, *l.c.*, p. v, 116, Tab. i, Fig. 10, 1900. AUSTRALIA.

16. *E. contigua*, Walk., *l.c.*, p. 138, 1848. Ricardo, ser. v, 112–116, 1900. AUSTRALIA.

17. *E. dilatata*, Jaennicke, Abhandb. Senckinberg, Naturforsch, Ges., vi, 328, 20, 1867. Ricardo, *l.c.*, p. v, 112, 1900. AUSTRALIA.

18. *E. divisa*, Walk., Insecta Saunders, Dip. i, 17, 1850. Ricardo, *l.c.*, p. 112-117, 1900. AUSTRALIA.

19. *E. gemina*, Walk., List. Dip. B. Mus. v, 138, 1848. Ricardo, *l.c.*, p. 112-117, 1900. WESTERN AUSTRALIA.

20. *E. guttata*, Don., Ins. N. Holland, 1805. Tab. and figure. Latr. Ency. Method. viii, 703, 5, 1811. Wied. Aussereurop. Zweifl., Ins. i, 194, 124, 1828. Guér. Voy. de Coquille, Zool. ii, 2, 289, 1830. Walk., *l.c.*, p. i, 141, 1848, and Supp., 1854. Ricardo, *l.c.*, p. 112–114, 1900.
Syn: *margaritifera*, Wied, *l.c.*, p. 1828. Macq. Ann. Soc. Ent. France, vi, 429, 1837: Dip. Exot., Supp. 3, 8, 1847. Williston, Kansas Univ., Quart. iii, 191, 1895.
EAST COAST, N. S. WALES, AUSTRALIA.

21. *E. Jacksonii*, Macq., Dip. Exot., i, 102, 10, 1838. Walk., *l.c.*, p. 1848; Insecta Saunders, Dip. i, 14, 1850; List Dip., Supp. v, 143, 126, 1854. Ricardo, *l.c.*, p. 112–117, 1900.
NEW SOUTH WALES, AND SWAN RIVER, WESTERN AUSTRALIA.

22. *E. limbinervis*, Macq., *l.c.*, p. 21, 62, 1855. Ricardo, *l.c.*, p. v, 112, 1900. AUSTRALIA.

23. *E. macroporum*, Macq., *l.c.*, Tab. xv, Fig 2, 1838. Walk., *l.c.*, p. v, Supp. i, 143, 129, 1854. Ricardo, *l.c.*, p. 112–117, 1900.
KANGAROO ISLAND, SOUTH AUSTRALIA.

24. *E. maculipennis*, Macq., *l.c.*, Supp. 4, 20, 45, 1850. Schiner, Novara Reise, Dip. 99, 46, 1868. Ricardo, *l.c.*, p. 106, 1900. AUSTRALIA.

25. *E. Media*, Walk., *l.c.*, p. 42, 1848. Ricardo, *l.c.*, p. 112, 1900.

26. *E. quadrimacula*, Walk, *l.c.*, p. 1, 138, 1848. Ricardo, *l.c.*, p. 112–116, 1900. AUSTRALIA.

27. *E. submacula*, Walk., *l.c.*, p. 142, 1848. Insecta Saunders, i, 13, 1850. Ricardo, *l.c.*, p. 112–115, 1900. AUSTRALIA.

28. *E. tricolor*, Walk., *l.c.*, p. 139, 1848. Ricardo, *l.c.*, p. 112–117, 1900. WESTERN AUSTRALIA

Genus :—DIATOMINEURA (Rondani, 1863).

29. *Diatomineura auriflua*, Don, Ins. N. Holland, 1805 ; figured under the name of *Pangonia*. Wied. Aussereurop, Zweifl. Ins. 194, 125, 1828. Walk., *l.c.*, Supp. i, 142, 122, 1854. Ricardo, *l.c.*, p. 112–119, 1900.

AUSTRALIA.

30. *D. brevirostris*, Macq., Dipt. Exot., Supp. 4, 22, 48, 1850. Ricardo, *l.c.*, p. 113, 1900.

AUSTRALIA.

31. *D. carnea*, Bigot, Mem. Soc. Zool. France, v, 619, 1892. Ricardo, *l.c.*, p. 113, 1900.

AUSTRALIA.

32. *D. clavata*, Macq., *l.c.*, p. 101, 1838. Walk., *l.c.*, Supp. 1, 143, 125, 1854. Ricardo, *l.c.*, p. 113, 1900.

AUSTRALIA.

33. *D. concolor*, Walk., Insecta, Saunders, Dip. 1, 14, 1850. Ricardo, *l.c.*, p. 113–118, 1900.

AUSTRALIA.

34. *D. constans*, Walk., *l.c.*, p. 1, 15, 1850. Ricardo, *l.c.*, p. 113–118, 1900.

AUSTRALIA.

35. *D. dorsomaculata*, Macq., *l.c.*, Supp. 4, 21, 47, 1850. Ricardo, *l.c.*, p. 113, 1900. TASMANIA.

36. *D. gagitina*, Bigot, *l.c.*, p. 620, 1892. Ricardo, *l.c.*, p. 113, 1900.

AUSTRALIA.

37. *D. gemella*, Walk., List. Dip. B.M. 1, 139, 1848. Ricardo, *l.c.*, p. 118, 1900.

WESTERN AUSTRALIA.

38. *D. jacksonienis*, Guér., Voy. de la Coquille, Zool. ii, 2, 288. Tab. xx, Fig. 3, 1832. Ricardo, *l.c.*, p. 118, 1900.

AUSTRALIA.

39. *D. minima*, Ricardo, Ann. Mag. Nat. Hist., Ser. 7, 119, Tab. 1, Figs. 4–5, 1900. AUSTRALIA.

40. *D. patula*, Walk., *l.c.*, p. 144, 1848. Ricardo, *l.c.*, p. 120, 1900.

AUSTRALIA.

41. *D. plana*, Walk., *l.c.*, p. 144, 1848. Ricardo, *l.c.*, p. 118, 1900.

AUSTRALIA.

42. *D. ruficornis*, Macq., Dip. Exot., Supp. 1, 25, 31, Tab. iii, Fig. 3, 1845. Walk., *l.c.*, p. 128, 1854. Ricardo, *l.c.*, p. 113, 1900.

TASMANIA.

43. *D. sub-appendiculata*, Macq., *l.c.*, p. 19, Tab. ii, Fig. 2, 1850. Ricardo, *l.c.*, p. 113, 1900.

AUSTRALIA.

44. *D. testacea*, Macq., *l.c.*, p. 99, 1838. Walk., *l.c.*, p. 145, 135, 1854. Ricardo, *l.c.*, p. 113, 1900. Hunter, Trans. Am. Ent. Soc. Philad., xxvii, 134, 1901.

AUSTRALIA.

45. *D. testaceomaculata*, Macq., *l.c.*, p. 21, 46, 1850. Ricardo, *l.c.*, p. 113, 1900. AUSTRALIA.

46. *D. violacea*, Macq., *l.c.*, p. 22, 49, Tab. ii, Fig. 3, 1850. Ricardo, *l.c.*, p. v, 113, 1900.

TASMANIA.

Genus :—CORIZONEURA (Ricardo, 1900).

Nearly all these species are originally described in the Genus *Pangonia* or *Tabanus*.

47. *Corizoneura angusta*, Bigot, Mem. Soc. Zool., France, v, 617, 1892. Ricardo, *l.c.*, p. 114, 1900.

AUSTRALIA.

48. *C. anthracina*, Macq., *l.c.*, p. 23, 50, Tab. ii, Fig. 3, 1850. Ricardo, *l.c.*, p. 113, 1900.

TASMANIA.

49. *C. brevipalpis*, Macq., *l.c.*, p. 38, 1847. Walker, *l.c.*, p. 144, 134, 1854. Ricardo, *l.c.*, p. 113, 1900.

AUSTRALIA.

50. *C. chrysophila*, Walk., *l.c.*, p. 155, 1848. Ricardo, *l.c.*, p. 120, 1900. Jaennicke, Abha. Senckenberg, Nat. Ges. vi, 327, 19, Tab. xliii, Fig. 3, 1867. AUSTRALIA.

51. *C. dives*, Macq., *l.c.*, p. 30, Tab. iii, Fig. 3, 1845. Walker, *l.c.*, p. 124, 1854. Ricardo, *l.c.*, p. 113, 1900.

TASMANIA.

52. *C. erratica*, Walk., *l.c.*, p. 189, 1848. Ricardo, *l.c.*, p. 121, 1900.

AUSTRALIA.

53. *C. fulva*, Macq., *l.c.*, p. 43, 1850. Ricardo, *l.c.*, p. 120, 1900.

AUSTRALIA.

54. *C. nigricornis*, Bigot, *l.c.*, p. 614, 1892. Ricardo, *l.c.*, p. 114, 1900.

AUSTRALIA.

55. *C. nigrosignata*, Thomas, Eugenies Resa, Dipt., 451, 12, 1868. Ricardo, *l.c.*, p. 113, 1900.

AUSTRALIA.

56. *C. rubiginosa*, Bigot, *l.c.*, p. 617, 1892. Ricardo, *l.c.*, p. 114, 1900.

AUSTRALIA.

57. *C. rufovittata*, Macq., *l.c.*, p. 19, 42, Tab. ii, Fig. 1, 1850. Ricardo, *l.c.*, p. 113, 1900. TASMANIA.

58. *C. trichocera*, Bigot, *l.c.*, v, 616, 1892. Ricardo, *l.c.*, p. 114, 1900.

Genus:—SILVIUS (Meigen, 1820).

59. *silvius marginatus*, Walk., List Dipt. B. Mus. i, 189, 1848. Ricardo, Annal. and Mag. Nat. Hist., ser. 7, viii, 296, 1901.

AUSTRALIA.

60. *S. nitescens*, Walk., Trans. Entom. Soc., London, n. ser. iv, 124, 1857. Ricardo, Annal. and Mag. Nat. Hist., ser. 7, viii, 296, 1901.

AUSTRALIA.

61. *S. silvester*, Bergr., Stettin. Entom. Zeitg. lv, 71, 1894.

AUSTRALIA.

Genus:—CHRYSOPS (Meigen, 1800).

62. *Chrysops testaceus*, Macq., Dipt. Exot. Supp. 4, 38, 17, 1850. Ricardo, Annal. and Mag. Nat. Hist., ser. 7, ix, 371, 1902.

TASMANIA.

Sub-family:—Tabaninæ.

Genus:—DASYBASIS (Macquart, 1846).

63. *Dasybasis appendiculata*, Macq., Dipt. Exot., Supp. 2, 25, 1, Tab. i Fig. 1, 1846. Walker, List Dipt. B. Mus., v, Supp. i, 266, 1, 1854 Ricardo, Annal. and Mag. Nat. Hist., ser. 7, xiv, 350, 1902.

AUSTRALIA

Genus:—TABANUS (Linn., 1761).

64. *Tabanus abstersus*, Walk., Insecta Saunders, Dipt. i, 58, 1850. Schiner, Novara Reise, Dipt., 85, 14, 1868.

AUSTRALIA.

65. *T. antecedens*, Walk., List Dipt. B. Mus., i, 178, 1848. Supp. i, 253, 440, 1854.

TASMANIA AND AUSTRALIA.

66. *T. avidus*, Bigot, Mem. Soc. Zool., France, v, 673, 1892. Described in the Genus *Atylotus*.

AUSTRALIA.

67. *T. basalis*, Walk., *l.c.*, p. i, 182, 1848.

AUSTRALIA.

68. *T. bifasciatus*, Macq., Suit. à Buffon, i, 201, 17, 1834. Walk., *l.c.*, v, Supp. i, 254, 447, 1854.

AUSTRALIA.

69. *T. brevidentatus*, Macq., Dipt. Exot., Supp. v, 28, 118, 1855.

TASMANIA, QUEENSLAND, AND NEW SOUTH WALES.

70. *T. brevior*, Walk., List Dipt. B. Mus. i, 188, 1848.

PORT ESSINGTON, NORTHERN AUSTRALIA.

71. *T. brevitta*, Walk., *l.c.*, p. i, 157, 1848.

AUSTRALIA.

72. *T. cinerascens*, King, Narrative, Survey Coasts of Australia, ii, 467, 184, 1827. Wied., Aussereurop. Zweifl. Ins., ii, 647, 71, 1830. Walk., *l.c.*, p. i, 150, 1848, v, Supp. i, 253, 443, 1854.

AUSTRALIA

73. *T. cinereus*, Walk., *l.c.*, p. i, 167, 1848.

WESTERN AUSTRALIA.

74. *T. claripennis*, Big., Mem. Soc. Zool., France, v, 675, 1892. Described in the Genus *Atylotus*.

AUSTRALIA.

75. *T. concolor*, Walk., *l.c.*, p. 179, 1848.

EAST COAST, NEW SOUTH WALES.

76. *T. constans*, Walk., *l.c.*, p. 186, 1848.

AUSTRALIA.

77. *T. cyaneoviridus*, Macq., Dipt. Exot. Supp. iv, 31, 101, 1850.

TASMANIA.

78. *T. cyaneus*, Macq., *l.c.*, Supp. iv, 30, 99, Tab. ii, Fig. 7, 1850.

TASMANIA.

79. *T. diminutus*, Walk., *l.c.*, p. i, 183, 1848.

PORT ESSINGTON, NORTHERN AUSTRALIA.

80. *T. dorsobimaculatus*, Macq., *l.c.*, Supp. iv, 29, 97, 1850.

AUSTRALIA.

81. *T. edentulus*, Macq., *l.c.*, Supp. i, 34, 68, Tab. iii, Fig. 13, 1845. Walk., List. Dipt. B. Mus. v, Supp. i, 251, 432, 1854. Originally described from Tasmania.

MT. KOSCIUSKO, NEW SOUTH WALES.

82. *T. exulans*, Erichson, Archev. f. Naturgesch., viii, 270, 247, 1842. Walk., *l.c.*, p. 252, 435, 1854.

AUSTRALIA AND TASMANIA.

83. *T. fraterculus*, Macq., Dipt. Exot., Supp. iv, 30, 98, 1850.

TASMANIA.

84. *T. funebris*, Macq., *l.c.*, Supp. i, 33, 67, Tab. iii, Fig. 12, 1845. Walk., *l.c.*, v, Supp. i, 254, 446, 1854.

AUSTRALIA.

85. *T. gentilis*, Erich., Arch. f. Naturgesch., viii, 1, 271, 249, 1842. Walk., *l.c.*, p. 254, 445, 1854.

TASMANIA.

86. *T. gregarius*, Erich., *l.c.*, p. viii, 1, 271, 248, 1842. Walk., *l.c.*, Supp. i, 252, 436, 1854.

BRISBANE, QUEENSLAND, AND TASMANIA.

87. *T. hyperythreus*, Bigot, Mem. Soc. Zool., France, v, 674, 1892. Described in the Genus *Atylotus*.

AUSTRALIA.

88. *T. imperfectus*, Walk., List. Dipt. B. Mus., i, 179, 1848.

AUSTRALIA.

89. *T. leucophilus*, Walk., *l.c.*, p. i, 154, 1848.

AUSTRALIA.

90. *T. limbatinervis*, Macq., Dipt. Exot., Supp. ii, 16, 93, 1847; and Supp. iv, 29, 96, 1850. Walk., List. Dipt. B. Mus. v, Supp. i, 254, 444, 1854.

TASMANIA AND AUSTRALIA.

91. *T. lunulatus*, Bigot, Mem. Soc. Zool., France, v, 688, 1892.

AUSTRALIA.

92. *T. macropthalmus*, Schiner, Novara Reise, Dipt, 82, 7, 1868.

AUSTRALIA.

93. *T. microdonta*, Macq., Dipt. Exot., Supp. ii, 17, 94, 1847. Walk., List. Dipt. B. Mus., v, Supp. i, 252, 438, 1854.

TASMANIA.

94. *T. nigriventris*, Macq., *l.c.*, Supp. i, 34, 69, 1845. Walk., *l.c.*, Supp. i, 252, 437, 1854.

SYDNEY, NEW SOUTH WALES.

95. *T. nigropictus*, Macq., *l.c.*, Supp. v, 24, 111, 1855. Van d. Walp., Catal. Dipt., South Asia, 60, 1896.

INDIA, AND RICHMOND RIVER, NEW SOUTH WALES.

96. *T. pallipennis*, Macq., *l.c.*, Supp. i, 32, 65, 1854. Walk., *l.c.*, v, Supp. i, 252, 439, 1854.

AUSTRALIA.

97. *T. postponeus*, Walk., *l.c.*, i, 179, 1848.

AUSTRALIA.

98. *T. præpositus*, Walk., *l.c.*, i, 158, 1848.

PORT ESSINGTON, NORTHERN AUSTRALIA.

99. *T. propinquus*, Macq., Dipt. Exot., Supp. v, 27, 117, 1855.

AUSTRALIA.

100. *T. pusillus*, Macq., *l.c.*, p. 29, 120, 1855.

AUSTRALIA.

101. *T. Regis-Georgii*, Macq., *l.c.*, i, 1A, 132, 21, 1838. Walk., List. Dipt. B. Mus., i, 178, 1844; Supp. i, 251, 434, 1854.

KING GEORGE'S SOUND, WESTERN AUSTRALIA; NORTH QUEENSLAND TO TWEED RIVER, NEW SOUTH WALES.

102. *T. remotus*, Walk., *l.c.*, i, 177, 1848.

AUSTRALIA.

103. *T. rufifrons*, Macq., *l.c.*, Supp. v, 28, 119, 1855.

AUSTRALIA.

104. *T. rufinotatus*, Bigot, Mem. Soc. Zool., France, v, 673, 1892.

AUSTRALIA.

105. *T. sanguinarius*, Bigot, Mem. Soc. Zool., France, v, 675, 1892.

SOUTHERN QUEENSLAND.

106. *T. sequens*, Walk., *l.c.*, i, 178, 1848.

PORT ESSINGTON, NORTHERN AUSTRALIA.

107. *T. sidneyensis*, Macq., *l.c.*, Supp. i, 66, 1845. Walk., *l.c.*, v, Supp. i, 253, 442, 1854.

SYDNEY, NEW SOUTH WALES.

108. *T. similis*, Macq., *l.c.*, Supp. iv, 31, 100, 1850.

TASMANIA.

109. *T. vetustus*, Walk., List. Dipt. B. Mus. i, 179, 1848.

SWAN RIVER, WESTERN AUSTRALIA.

Sydney: William Applegate Gullick, Government Printer.—1911.

MARCH FLIES.

1. *Tabanus brevidentatus.*
2. *Tabanus sanguinarius.*
3. *Tabanus ardens.*
4. *Pangonia auriflua.*
5. *Tabanus edentulus.*
6. *Tabanus jacksonii.*
7. Foot of *Pangonia guttata.*
8. *Pangonia guttata.*
9. *Tabanus gregarius*

[All enlarged.

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